

Cross dialectal vowel spaces in Greek

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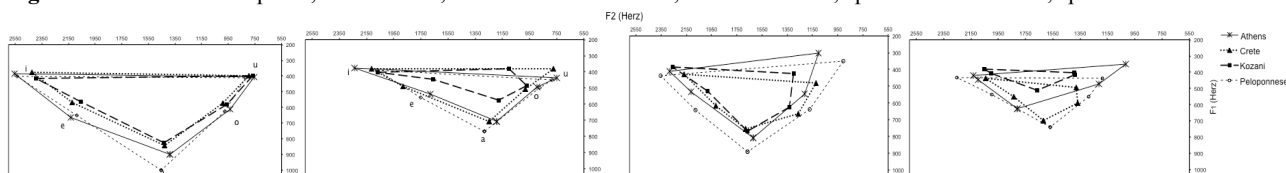
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Cross-dialectal/linguistic surveys on vocalic systems allow for a better understanding of the possible organization of vocalic systems. Across languages, 75% of vowel inventories contain the same specific five to seven vowels, most often /i, e, a, o, u/ for five-vowels (Maddieson, 1984). Such proclivities have given rise to well-known hypotheses on the forces shaping vowel spaces: Dispersion Theory postulates that the distance among vowels serves to reduce confusion and increase perceptual contrast (Liljencrants and Lindblom, 1972; Lindblom, 1986); the Quantal Theory of speech (Stevens, 1989) suggests there are regions of stability in the phonetic space, in particular for the point vowels /i/, /a/, /u/ which are predicted to remain in the same positions across languages, regardless of vocalic inventory size. Our paper presents evidence suggesting a more complex picture than either of these hypotheses suggest.

Our data arise from a larger project (Vocalect), which contributes, for the first time, a comprehensive description and analysis of the vocalic systems of several Modern Greek (MG) regional dialects, most of which are endangered, at a phonetic and phonological level. One of the project's ultimate goals is the contribution to the creation of a dialect atlas for Greek, a resource so far missing (cf. Trudgill, 2003). We martial acoustic, articulatory (EPG) and perceptual analyses of vowel data collected through extensive fieldwork. Here we present results from a subset of our corpus: the vocalic system of four dialectal areas of Greece (Macedonia, Peloponnese, Athens and Crete) based on controlled and spontaneous speech material from 40 and 8 speakers respectively, balanced for sex and dialect (3,600 tokens).

We investigate the durations, F1XF2 acoustic space and formant distances between adjacent vowels as a function of dialect, gender, speech style and stress. Our preliminary analysis of female speech shows an effect of all aforementioned factors (Fig 1): vowels in unstressed and spontaneous conditions occupy less space and have different distributions and distances from those in stressed and read conditions; Cretan and Macedonian vowel spaces are more compressed (area of 390 and 370 KHz respectively calculated using Heron's formula) than the Athenian and Peloponnesian (500 and 516 KHz respectively). Back vowels appear much fronter in conversational speech; vowels are not maximally dispersed; the point vowels (/i/, /a/, /u/) are in different positions and with dissimilar acoustic distances across dialects; adjacent vowels are not equidistant across dialects.

Figure 1: Female vowel spaces, 4 conditions, from left: read stressed; read unstressed; spontaneous stressed; spontaneous unstressed.



The initial picture emerging is intriguing and suggests that the explanation behind vocalic space structure is more complex than the aforementioned hypotheses. The variation observed may relate to several factors. Previous literature indicates that acoustic vowel targets can differ in languages/dialects with the same number of vowel contrasts due to phonological or historical reasons; thus frequency intervals between adjacent vowels can relate to dialect-dependent patterns rather than to universal ones (e.g., Bradlow, 1995, Recasens & Espinosa, 2006). Such patterns are seen in the MG dialects. For example, Macedonian is known for massive vowel deletions (Topintzi & Baltazani, 2012) which lead to more closed syllables and a greater degree of palatalization in its consonantal inventory, factors which can correlate with the observed shift in vocalic space (cf Bradlow, 1995). Differences may also occur due to context-dependent variability across dialects, such as consonantal inventories and inherent vowel durations in different rates of production. Overall, our work showcases how indispensable cross-dialectal variation studies are for the deeper understanding of speech production variation. We will discuss dialect-specific sources of variability under the scope of current theories on i) vowel dispersion, ii) direction of unstressed phonetic reduction, and iii) sociolinguistic variation across genders.

References

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